Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 23, Issue 1, 2023
PRINT ISSN 2284-7995, E-ISSN 2285-3952

TRENDS IN RURAL TOURISM DEVELOPMENT IN LVIV REGION BASED ON FORECASTING

Iryna DYDIV

Lviv National Environmental University, 1, Volodymyra Velykoho Street, Dublyany, Lviv district, Lviv region, Ukraine, 80381, Phone: (+380) 9825 83 884, E-mail: ira.dydiv@gmail.com

Corresponding author: ira.dydiv@gmail.com

Abstract

The rural tourism is a promising type of tourism in rural areas that increases the socio-economic level and well-being of the population. The entrepreneurial activity in villages provides an opportunity to expand employment, increase investment attractiveness and contribute to the improvement of rural infrastructure. Based on the analysis of data for the period 2012-2020, the forecast trends in the number of rural tourism farmsteads and their visitors in Lviv region are presented using trend analysis and the FORECAST.ETS.STAT function for the period 2021-2025. The Russian military aggression against Ukraine and the COVID-19 pandemic significantly affect the activities and prospects for the development of rural tourism in the country. Having built logarithmic, linear, exponential, power and polynomial trend models, the probable indicators for the specified period were forecasted. The current state and trends of rural tourism development during the COVID-19 pandemic and in the context of Russia's military aggression in Eastern Ukraine are considered. The formation and sale of quality products and services in the field of rural tourism involve providing a favorable environment and improving the quality of functioning of rural tourism estates. The development of rural tourism depends on the desires and demands of tourists, which form the demand in this area, which in turn creates supply in the market of tourist services and further development of business activities in the field of services in rural areas.

Key words**:** *rural tourism, rural tourism farmstead, tourist, economic forecasting*

INTRODUCTION

Rural tourism is a promising type of entrepreneurial activity in rural areas, which expands the sphere of employment, promotes socio-economic development, improves infrastructure, increases investment attractiveness, ensures the rational use of natural resources and historical and cultural heritage, and most importantly - preservation of human potential, revival and dissemination of Ukrainian folk traditions, customs and culture. The activity of rural tourism will contribute to the increase of incomes of villagers, the development of self-education and training in the service sector, learning foreign languages and the overall socio-economic development of the village population

Accelerated development of rural tourism involves ensuring demographic stability in Ukraine and solving socio-economic problems of rural areas. The comprehensive scientific and methodological approach to the study of rural tourism is based on human resources, availability of free housing stock, quality and level of development of social infrastructure, ecological situation, tourist and recreational potential, land and water resources, production of organic products, geographical location, natural and climatic conditions, seasonal fluctuations in supply and demand.

The prospects for the formation and development of rural tourism are determined on the basis of the analysis of the conducted research by the forecasting method. The method of economic forecasting is a set of methods and techniques for developing forecasts that allow, based on the analysis of retrospective data (analyzing the number of farmsteads and visitors for a certain period), external and internal factors of influence, as well as their quantitative changes, to make convincing predictions about the future development of business activities in the field of rural tourism for the coming years in the Lviv region.

Rural tourism, ecotourism and agritourism have become very popular in recent years, as a significant number of citizens in various

fields of activity have switched to remote work and study for a long time with a trip to rural areas. At the same time, renting houses, cottages, separate rooms in private farms. During the COVID-19 pandemic in Lviv region and throughout Ukraine, domestic tourism began to develop significantly, and much attention was paid to rural tourism. The problems of rural tourism in the market of tourist services, the possibilities of rational use of tourist and recreational resources of rural areas, the factors influencing the development of tourism activities in the countryside, the classification and categorization of rural tourism estates, the importance of regional clusters for rural areas, and the application of new scientific approaches for the effective organizational and economic functioning of rural tourism in the Lviv region are considered. For the successful functioning of rural tourism, its activities cannot be reduced only to responding to changes that occur in the tourism sector. Therefore, there is a need to manage these changes on the basis of scientifically based procedures, namely the regulation, forecasting and adaptation of rural tourism and the farmsteads themselves to quality tourist services, the introduction of innovations and investment activities to improve the socio-economic situation in rural areas.

A modern management tool is the methodology of strategic business management. The study of the essence, role and tasks of rural tourism and the processes of forming a development strategy, which contain generalization and deepening of theoretical and methodological foundations, as well as the development of relevant scientific and practical recommendations on the prospects for the formation and forecasting of rural tourism development strategy on the basis of entrepreneurship, are relevant. In this context, the purpose of the paper was to analyze the trends in rural tourism in Lviv region based on forescasting.

MATERIALS AND METHODS

Having analyzed the statistical information, the forecast trends in the development of rural tourism farmsteads in Lviv region until 2025 and the number of tourists who will use the services of rural tourism farmsteads are presented. [2].

Based on the results of the study, the activity of rural tourism estates during 2012-2020 was analyzed. The forecast trends in the number of rural tourism farmsteads for the period 2021-2025 is based on the parameters of the trend line of the following models: linear; logarithmic; exponential; polynomial; power [4, 6].

The reliability of the obtained trend equations was checked using the determination coefficient R^2 and Fisher's statistical criterion. Depending on how close the value of the coefficient of determination R^2 is to 1, respectively, the model is considered reliable. The best estimate of the adequacy of the model to the nature of the original data is given by the Fisher's statistical criterion, which was calculated by the formula:

$$F_{calc.} = \frac{R^2}{1-R^2} \cdot \frac{k_2}{k_1} \quad \text{.....(1)}$$

If the calculated value of Fisher's criterion according to formula 1 is greater than the table value, the model is considered adequate to the empirical data. In our case, the table value of the criterion F_{table} ($k_1 = 1$, $k_2 = n-1-1 = 9-1-1 = 7$, $\alpha = 0.01$) = 12.25 at a probability of $p = 0.99$ or the criterion F_{table} ($k_1 = 1$, $k_2 = 7$, $\alpha = 0.05$) = 5.59 at a probability of $p = 0.95$, or for the significance equation $\alpha = 1 - p$ and degrees of freedom $k_1 = 1$, $k_2 = 7$. The value of n is the number of periods under study.

Also, for the forecasting of the studied indicators, the spreadsheet processor Microsoft Office Excel 2016 with the built-in forecasting function and the inclusion of additional statistical information in the forecasting sheet was used. A table of statistics was created in the forecasting sheet using the FORECAST.ETS.STAT function. The advantage of using the STAT function is that it contains such measures as smoothing coefficients (Alpha, Beta, Gamma) and error rates (MASE, SMAPE, MAE, RMSE). The seasonal factor was also used in the forecast calculations [5]. To better assess the accuracy

of the forecast, the standard value of the confidence level was applied - 95%. As a result of the forecasting analysis, three acceptable trends were identified on the graph: prediction, upper and lower confidence limits.

RESULTS AND DISCUSSIONS

The development of rural tourism is aimed at meeting the needs of tourists in recreation and leisure, improve the physical and emotional health of the population, as well as the state of the environment. During the creation of amalgamated territorial communities, great importance is attached to
the regional clustering of the tourism sector, as rural tourism is able to form a positive image of a particular territory of a particular region and provide financial revenues for the development of territorial communities.

Tourist activity in the field of rural tourism deserves important attention, as it does not require significant capital investments, but provides an opportunity to use free living space and natural resources. But in order for rural tourism to be a promising business activity, regional strategies for the development of the tourism sector should be developed, which would meet the requirements of European standards with the aim of entering the international market. Important attention should be paid to the clustering of rural areas using tourism activities, as this will contribute to the overall development of a certain region. For the development of rural tourism, it is necessary to identify the problems of functioning and legal regulation of this activity, improvement of the legal framework in the field of rural tourism. [3].

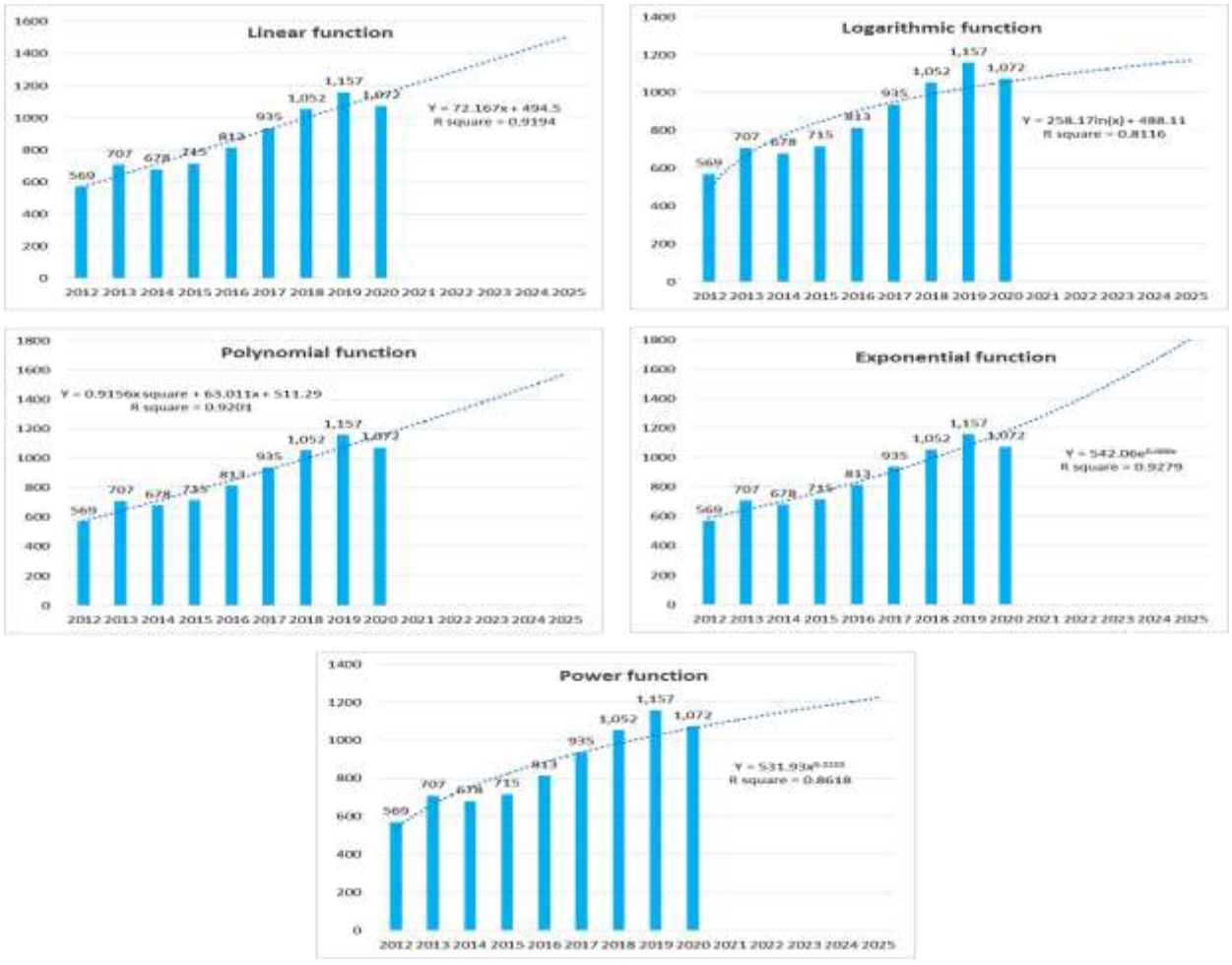


Fig. 1. Forecasting the number of rural tourism estates in Lviv region using trend analysis for the period 2021-2025.
Source: Authors' drawing.

In the modern world, the implementation of statistical analysis of the phenomena and processes that occur in rural tourism is of great importance. Especially relevant was the development of economic forecasts of rural tourism development for the near future in conditions of constant uncertainty and a certain lack of statistical information [10].

Information aimed at the future, i.e. forecast trends, is of great importance. Forecasting is the modeling of the real situation, its implementation in the abstract sphere with the verification of the final results and analysis of the course of the forecasted situation. Forecasting is an integral part of the management process of any business activity. This is especially true in the field of economic phenomena, in which the result of decisions made today largely depends on what will happen tomorrow. Forecasting reduces uncertainty and helps to increase the accuracy of decisions, and thus eliminate losses of business entities.

In order to identify the most reliable forecasts of the number of rural tourism farmsteads in Lviv region, a trend analysis was carried out using linear, logarithmic, exponential, polynomial and power functions, which showed reliable forecasts for the period 2021-2025 (Fig. 1).

The obtained models were tested for reliability of the initial data by Fisher's F-criterion with a significance level of $\alpha = 0.99$ and $\alpha = 0.95$ and using the determination coefficient R^2. It was found that the forecast of the number of rural tourism farmsteads in Lviv region changed according to the regression equation (Table 1).

Table 1. Forecast values of the number of rural tourism farmsteads in Lviv region based on trend analysis

Type of model	Trend equation	R^2	$F_{calc.}$	Year				
				2021	2022	2023	2024	2025
Linear	$y = 72.167x + 494.5$	0.9194	79.84**	1,216	1,288	1,361	1,433	1,505
Logarithmic	$y = 258.17ln(x) + 488.11$	0.8116	30.15**	1,083	1,107	1,130	1,150	1,169
Polynomial	$y = 0.9156x^2 + 63.011x + 511.29$	0.9201	80.61**	1,233	1,315	1,399	1,485	1,573
Exponential	$y = 542.06e^{0.086x}$	0.9279	90.09**	1,281	1,396	1,521	1,658	1,807
Power	$y = 531.93x^{0.3155}$	0.8618	43.65**	1,100	1,133	1,165	1,195	1,223

Notes: 1. * - reliability of the model to the original data with probability p = 0.95 (significance level α = 0.05);
2. ** - reliability of the model to the original data with probability p = 0.99 (significance level α = 0.01).
Source: Authors' drawing.

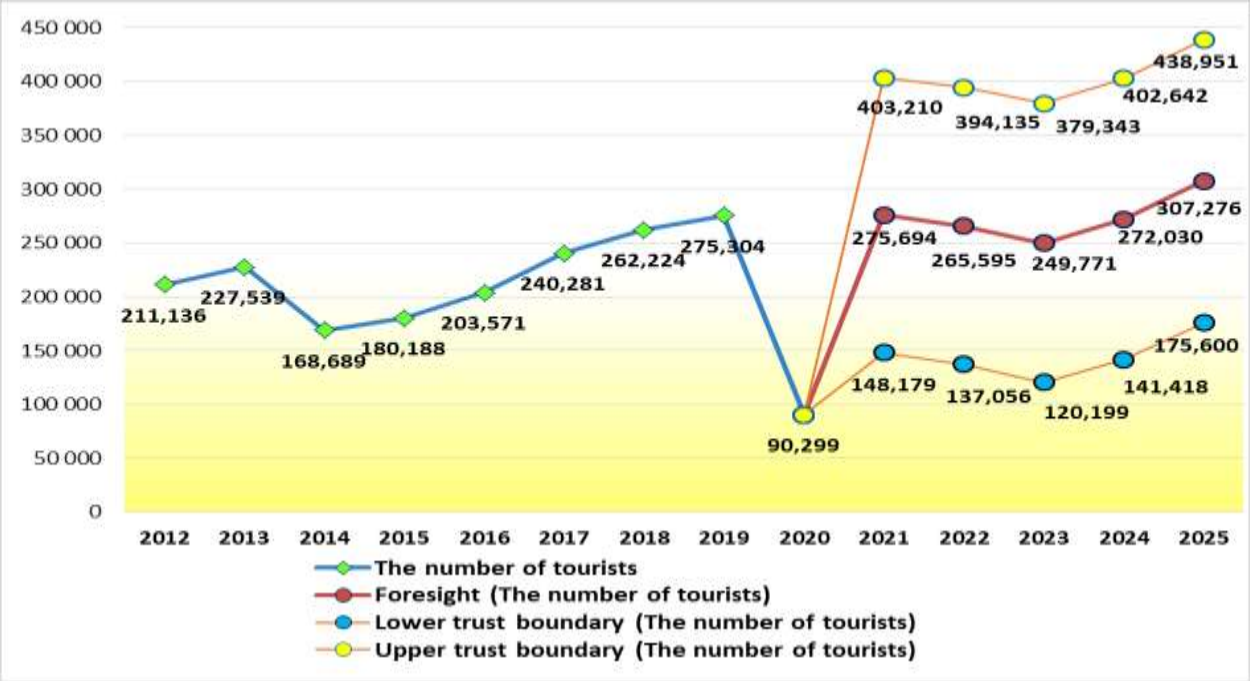
According to the linear trend equation y = 72.167x + 494.5, the number of rural tourism farmsteads in Lviv region is likely to increase by 72 dwellings annually with a determination coefficient of $R^2 = 0.9194$. It is found that in 2021 the number of rural tourism farmsteads is likely to increase to 1,216, while in 2025-1505. Checking for compliance of the linear trend model with the initial data by Fisher's criterion indicates a sufficiently high reliability of the forecast, since the calculated value of the criterion $F_{calc.} = 79.84$ is significantly higher than table $F_{table.} = 12.25$ with probability p = 0.99 and degrees of freedom $k_1 = 1$, $k_2 = 7$. Thus, the linear regression equation indicates a positive dynamics of increasing the number of rural tourism farmsteads in Lviv region for the next five years. The forecast according to the logarithmic regression equation y = 258.17ln(x) + 488.11 demonstrates a slow growth in the number of rural tourism farmsteads in Lviv region, which is similar in nature to the power model. It is noted that the coefficient of determination ($R^2 = 0.8116$) and the F-criterion in this model was the smallest ($F_{calc.} = 30.15$). Thus, among all the other trend models that were used, it is the logarithmic model that shows the smallest tendency to increase the number of rural tourism estates. It was determined that in 2021 the number of rural tourism is likely to increase to 1,083, in 2022-1,107, and in 2025-1,169.

According to the results of Table 1, it was established that according to the polynomial function with the regression equation $y = 0.9156x^2 + 63.011x + 511.29$, the number of rural tourism estates in the Lviv region is gradually increasing ($R^2 = 0.9201$). So, in

2021, the number of rural tourism estates according to the polynomial function will be 1,233 farmstead, and in 2025 it will increase to 1,573.

It was determined that the exponential model with the regression equation y = 542.06e0.086x describes the most positive forecast for the increase in the number of rural tourism estates in the Lviv region.

It was determined that at the highest value of the coefficient of determination $R^2 = 0.9279$, the calculated Fisher's criterion was $F_{calc.} = 90.09$. Checking for compliance of the selected model with the Fisher criterion to the tabular indicators indicates the highest compliance of the studied model with the initial data with a probability of p = 0.99. It is predicted that in 2021 the number of rural tourism farmsteads will be 1,281, in 2022 - 1,396, while in 2025 there will be 1,807 (at a significance level of α = 0.01).



Year	The number of tourists	Foresight (The number of tourists)	Lower trust boundary (The number of tourists)	Upper trust boundary (The number of tourists)	Statistics	Value
2012	211,136				Alpha	0.13
2013	227,539				Beta	0.00
2014	168,689				Gamma	0.00
2015	180,188				MASE	0.94
2016	203,571				SMAPE	0.22
2017	240,281				MAE	43.074.05
2018	262,224				RMSE	65.060.15
2019	275,304					
2020	90,299	*90,299*	*90,299*	*90,299*	Confidence interval	95%
2021		**275,694**	**148,179**	**403,210**	Seasonality	4
2022		**265,595**	**137,056**	**394,135**		
2023		**249,771**	**120,199**	**379,343**		
2024		**272,030**	**141,418**	**402,642**		
2025		**307,276**	**175,600**	**438,951**		

Fig. 2. Forecasting the number of tourists who will use rural tourism services in the Lviv region using the FORECAST.ETS.STAT function for the period 2021 – 2025
Source: Authors' drawing.

The program forecasts the number of tourists in Lviv region for the period 2021-2025 using the FORECAST.ETS.STAT function. Accordingly, according to the results of the

research, having received the trend of changes in the number of tourists in Lviv region for the period, we will determine the values of indicators that are taken outside the empirical series (Fig. 2).

The results of forecasting the number of tourists in Lviv region who will use the services of rural tourism indicate that in 2021, according to the trend "Forecast", their number is likely to increase compared to 2020 by 185,395 people, or 205.31% to 275,694 people. However, it should be noted that from 2022 to 2023, there is a tendency to decrease the number of tourists to 249,771 people, while from 2024 to 2025, a probable increase in their number is projected from 272,030 to 307,276.

As can be seen from Figure 2. The "Lower Confidence Boundary" and "Upper Confidence Boundary" are in a fairly wide range of the forecast at the 95% confidence interval and the fourth seasonality parameter. However, taking into account the COVID-19 pandemic and Russia's armed aggression against Ukraine, it is worth taking indicators in the range of trends of the "Lower confidence limit" and "Prediction". It is worth considering the fact that any statistical function is not able to take into account the huge amount of factors that change daily and affect the trend of the future forecast. In addition, the existing trend-based forecasting models are essentially a projection of the past and are largely based on historical data, which may not have a similar cyclicity in future forecasts and similar trends

Taking into account that the used models of statistical forecasting functions do not take into account many objective factors, therefore, we have developed our own forecast of the number of rural estates and tourists who will use their services in Lviv region for the period 2021 - 2025, taking into account many factors, trends and in-depth economic analysis.

To build a trend forecast of the number of rural tourism farmsteads and tourists in Lviv region, social, political, economic factors, as well as current information and forecasts from leading world organizations were taken into account: military aggression of the Russian Federation against Ukraine; the incidence of COVID-19; the state of the socio-political situation in Ukraine; forecasts from the World Health Organization and the Ministry of Health of Ukraine; forecast of the World Tourism Organization; forecast of the World Bank [12]; real wage index in Ukraine; GDP dynamics of Ukraine; forecasts of leading analysts, experts and scientists.

It should be noted that the biggest factors that currently affect the development of rural tourism in Ukraine and Lviv region are the COVID-19 pandemic and the "hybrid" war between Ukraine and Russia.

In addition, the purchasing power of the population, the level of fight against corruption, the implementation of reforms, political and social tensions in society are also important. The economic factors that were taken into account in the forecasting of rural tourism development are interrelated with political, social and other global processes. Having analyzed the above factors, the author has developed forecast trends in the development of rural tourism in Lviv region. (Fig. 3).

Analyzing the forecast of the number of rural tourism farmsteads in Lviv region for the period 2021-2025, we note that their number probably does not have such a rapid tendency to decrease, or vice versa - to increase. Another thing is when it comes to the temporary suspension of their activities to provide rural tourism services during the COVID-19 pandemic, the introduction of a lockdown or "red zone" in the region, which physically restrict the movement of tourists. It is projected that the number of rural tourism farmsteads in 2021 and 2022 will increase by only 34 and 90 farmsteads, or 3.17 and 8.39%, compared to 2020. Based on the economic analysis, it is expected that from 2023 to 2025 their number will increase significantly, for which there are all the prerequisites and arguments below.

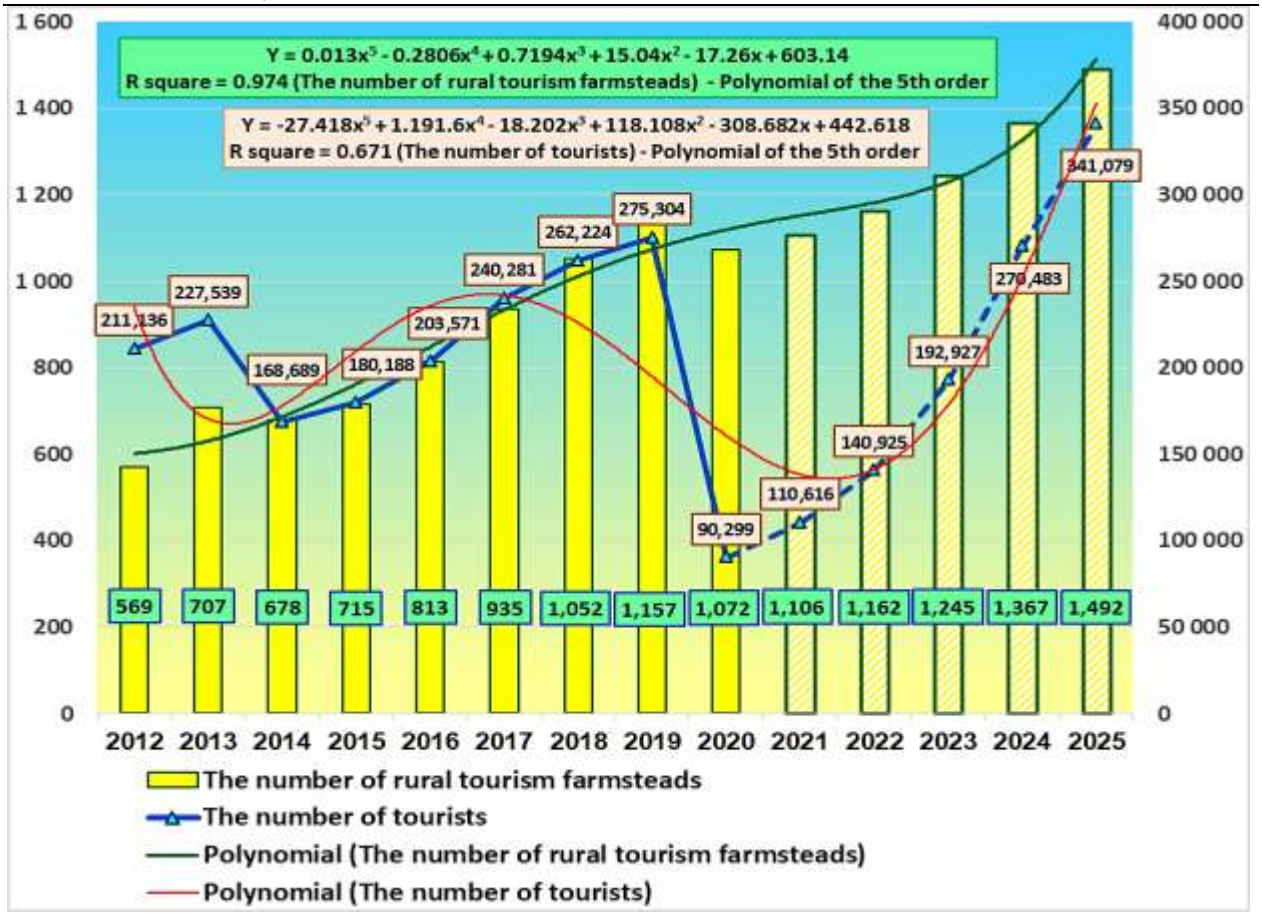


Fig. 3. Forecasting the number of rural tourism farmsteads and tourists who will use the services of rural tourism in Lviv region for the period 2021 - 2025
Source: Authors' drawing.

General trends in the number of tourists visiting rural tourism estates in Lviv region for the period 2021-2022 will increase gradually. So, in 2021, the number of tourists is likely to increase compared to 2020 by 20,317 people, or 22.5%, while in 2022 their number will increase compared to the previous year by 30,309 people, or 27.4% with a determination coefficient of $R^2 = 0.671$ (5th order polynomial regression equation). The situation with the flow of tourists should improve in 2023-2025. It is projected that the number of tourists who will use the services of rural tourism is likely to increase in 2023 to 192,927 people, which is more than in 2022 by 52,002 people, or 36.9%. In 2024, their tourist activity will increase to 270,483 people, while in 2025 their number is projected to increase to 341,079 people. It should be noted that only in 2025 the number of tourists who will use the services of rural tourism in the Lviv region will increase by 65,775 people, or 23.89%, compared to 2019 and will actually reach a positive trend in the period.

Nevertheless, it is worth considering that most experts predict the duration of the COVID-19 pandemic to be at least three years. However, some skeptics predict stabilization of the situation in the world in 2024.

It should be noted that of all types of tourism, it is rural tourism that limits mass crowds of tourists and to some extent reduces the number of contacts. Also, rest in rural estates involves tourists staying in the fresh air and consuming natural, environmentally friendly food. In a pandemic, this type of tourism is more accessible, as there are quarantine restrictions on the activities of hotels, hostels, boarding houses, sanatoriums, campsites and other tourist facilities that are in the red zone. However, receiving tourists in rural estates under such conditions is a personal matter of the owners of the estates at their own risk and responsibility.

Due to the COVID-19 pandemic, the share of

domestic tourists has increased significantly due to the closure of borders to many countries. In addition, the rules for crossing the entry-exit border have become more complicated (negative PCR test, certificate or certificate of vaccination, self-isolation) [8]. Under such circumstances, domestic tourism, in particular rural tourism, is gaining intensive development. However, today there are still new challenges and threats to the development of rural tourism due to the cyclical nature of the disease and the spread of new aggressive strains of the virus, which can significantly limit the movement of all tourists, especially in regions with a red zone.

Urgent steps are needed to stem the rising death toll and the economic strain caused by the COVID-19 pandemic, which are exacerbating an already steep recovery. Pandemic policy is also economic policy, as there is no lasting end to the economic crisis without ending the health crisis [1, 7]. In the global world, no country will be able to return to normal until all countries can overcome the pandemic.

Also, in case of Ukraine, the hostilities between Russia and Ukraine have also affected the whole economy, including tourism and created a social tension [9].

The world is faced with an unprecedented global health emergency - the COVID-19 pandemic, which is why tourism has been the most affected of all sectors of the economy (suspended flights, closed hotels and travel restrictions in almost all countries of the world). According to the World Tourism Organization (UNWTO), international tourist arrivals fell from almost 1.5 billion in 2019 to approximately 380 million in 2020, a decrease of 74%. This represented a loss of approximately US$1.3 trillion. UNWTO forecasts two scenarios for the development of international tourist flows in 2021. In 2020, foreign tourist arrivals to Ukraine decreased by 75%. It is projected that the recovery of tourist flows will take place no sooner than 2023-2024.

Today, the tourism industry in Ukraine has lost more than $ 1.5 billion and may lose another $ 3-5 billion if strict quarantine restrictions continue. If the quarantine continues, the lion's share of companies and establishments in the tourism sector will not be able to survive it, as approximately 80% of hospitality establishments are small businesses (individual entrepreneurs) [11].

Thus, a positive scenario for the development of rural tourism for the next five years is possible only if the rate of vaccination of the population increases and basic quarantine measures are observed.

Rural tourism is a type of tourism that has every chance to recover most quickly after the pandemic, compared to other types of tourism. An important condition for the development of rural tourism is also the end of the war and the continuation of effective reforms in all spheres of life in the country.

CONCLUSIONS

Statistical trend analysis contributes to a better understanding of the forecast of rural tourism development not only in Lviv region and in Ukraine, but also in the tourism industry as a whole. Scientific research will allow to make more effective management decisions in the field of rural tourism and tourism business in general, on which tomorrow's result will largely depend. It should be noted that forecasting reduces uncertainty and helps to increase the accuracy of decisions in the tourism sector.

Based on the trend analysis, the number of rural tourism farmsteads in the Lviv region, as well as the number of tourists who used the services of rural tourism, was forecasted.

According to the forecast trends, it was found that rural tourism has all the necessary resources for further development.

Rural tourism has all chances to revive the fastest after the pandemic, compared to other types of tourism, as domestic tourism and recreation in rural areas are becoming popular.

REFERENCES

[1]Agarval, R., Gopinath, G., 2021, Staff Discussion Notes No. 2021/004: A Proposal to End the COVID-19 Pandemic (May 19, 2021), International Monetary Fund, https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2021/05/19/A-Proposal-to-

End-the-COVID-19-Pandemic-460263, Accessed on 12th November, 2022.
[2]Antoshkina, L.I., Stechenko, D.M., 2015,Methodology of economic research: a textbook, Kyiv: Knowledge, 312 p.
[3]Boyko, V.O., 2020, Rural green tourism in Ukraine: problems and prospects, Agrosvit, Vol. 22, pp. 58-65.
[4]Burtnyak, I.V., Blahun, I.S., Malytska, H.P., 2011, Forecasting of economic and social processes: textbook, Ivano-Frankivsk: PNU, 84 p.
[5]Dydiv I., 2022, Tendence of rural green tourism development in Ukraine on the basis of forecasting. Zeszyty Naukowe WSTiE, Vol. 22(2), 46-56, https://dspace.uzhnu.edu.ua/jspui/bitstream/lib/45684/1/ZN22.pdf, Accessed on 3th November, 2022.
[6]Kichor, V.P., Feshchur, R.V., Yakimov, A.I., Skvortsov, D.I., Vysotsky A.L., 2019, Methods and models of economic forecasting: textbook, Method, Lviv: Raster-7, 272 p.
[7]Ministry of Health of Ukraine: Operational information on the spread and prevention of COVID-19; https://moz.gov.ua/article/news/operativna-informacija-proposhirennja-koronavirusnoi-infekcii-2019-cov19,Accessed on 11th November, 2022
[8]Nepochatenko, V. O., 2020, Covid-19 and tourism: analysis of the situation and economic ways out of the crisis. Effective economy. Vol. 7, DOI: 10.32702/2307-2105-2020.7.52, Accessed on 18th November, 2022.
[9]Krupa, O., Krupa, V., Dydiv, I., Horpynchenko, O., Kovalenko, S., 2022, Economic Consequences of the Impact of War on Labor Resources and Tourism in Terms of Ensuring Economic Security. IJCSNS International Journal of Computer Science and Network Security, Vol.22 (7),117-122. https://doi.org/10.22937/IJCSNS.2022.22.7.15, Accessed on 19th November, 2022
[10]Pechenyuk, A. P., Ivanyshyn, V. V., 2017, Features of statistical research of rural green tourism. Economy and society. Odesa, 2017. №12. pp. 730-735., https://economyandsociety.in.ua/journals/12_ukr/123.pdf, Accessed on 14th November, 2022.
[11]The UNWTO Tourism Data Dashboard: International Tourism and COVID-19; https://www.unwto.org/international-tourism-and-covid-19, Accessed on 17th November, 2022.
[12]The World Bank: Subdued Global Economic Recovery, https://www.worldbank.org/en/publication/global-economic-prospects, Accessed on 12th November, 2022.